

REMARKS/ARGUMENTS

Reconsideration and allowance of the subject application are respectfully requested.

Claims 1 - 13 are currently pending in the application. Claims 1 and 13 are independent.

Claim Rejections - 35 U.S.C. §102

The claims 1, 3 and 13 were rejected under 35 U.S.C. § 102 (b) as being anticipated by Quistgaard (U.S. 5,485,842). The Applicants respectfully traverse all art rejections.

Quistgaard is directed to a method and apparatus for processing a plurality of ultrasound acquired scan planes in order to present a three-dimensional image of a target tissue. Through conventional scan conversion techniques, two-dimensional images are processed to approximate their rotation to various acquired scan planes and projection back to a reference plane such as the original image plane. These stored images comprise a set of corresponding projected images offset with respect to each other. Each combined image is a different view of a three-dimensional region occupied by the planar image information. It is the sequence of the entire combined images which may be replayed on a display to depict the three-dimensional image as if it is rotating in front of a viewer. Thus, the three-dimensional image comprises a set of corresponding projected images offset with respect to each other. Further, at column 8, lines 45 to 65, Quistgaard discloses a number of methods for enhancing the three-dimensional image suggesting that there are deficiencies with the method provided.

Applicants believe that the Examiner may have misinterpreted the teachings of Quistgaard. Quistgaard does not teach as stated by the Examiner "transforming only image data within the received two-dimensional images that is necessary to view the selected three-dimensional image surfaces (column 8,

lines 28 to 32). This passage only describes that the sequence of the views is stored as each view is assembled and that the sequence can be recalled from memory and displayed in real time. This passage does not teach or suggest fast reconstruction of fan and axially acquired data as recited in claim

1: "transformation means...image surface". As such claims 1, 3 and 13 include this novel limitation and are therefore novel and thus patentable.

In contrast, the presently claimed invention is directed to a method and system for fast linear reconstruction of (i.e. angularly scanned data fan and axially acquired ultrasound data) to rapidly and accurately provide a three-dimensional image of a target tissue. Fast linear reconstruction has never been previously shown with respect to fan and axially acquired ultrasound data. In the presently claimed method, **only the specific image data from fan and axially acquired two-dimensional image slices that are actually required to view the user-selected image undergoes reconstruction**. By only transforming specific image data that is required, (that is, the data representing the edge of the target tissue and not all image data from fan and axially acquired two-dimensional slices), the resources required to generate accurate and high-resolution three-dimensional images of the target volume is reduced. It is clear that this approach is different than that disclosed by Quistgaard, wherein all image data is used to present a three-dimensional view through the overlapping of the two-dimensional images at an offset.

It is, therefore, asserted that claim 1 patentably distinguishes over the cited prior art of record, and is, therefore, allowable.

As claim 3 depends directly on claim 1, which is deemed allowable, the Applicants respectfully submit that claim 3 is also allowable.

Further, as claim 13 includes similar limitations as claim 1, the Applicants respectfully submit that claim 13 patentably distinguishes over the prior art and should therefore be allowed.

Claim Rejections - 35 U.S.C. § 103

Claims 2 and 5 are rejected under 35 U.S.C. § 103(a) as being unpatentable in view of Quistgaard and further in view of Fenster (U.S. 5,454,371). Claims 4, 9 and 10 are rejected under 35 U.S.C. § 103 (a) as being unpatentable over Quistgaard in view of Fenster (U.S. 5,842,473) and further in view of Hossack (U.S. 6,360,027). Claim 6 is rejected under 35 U.S.C. § 103 (a) as being unpatentable over Quistgaard and further in view of Fenster (U.S. 5,842,473) and Hossack. Claim 7 is rejected under 35 U.S.C. § 103 (a) as unpatentable over Quistgaard, in view of Fenster (U.S. 5,842,473), and further in view of Hossack and Fenster (5,454,371). Claim 8 is rejected under 35 U.S.C. § 103 (a) as unpatentable over Quistgaard, in view of Fenster (U.S. 5,842,473) and further in view of Hossack. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Quistgaard in view of Yamazaki (U.S. 5,497,776). The Applicants respectfully disagree with the Examiner.

It is asserted that neither Quistgaard nor Fenster '371 teach or suggest the fast reconstruction of data obtained via a non-linear scanning path as is presently recited in claim 1, from which these claims (claims 2 and 5) depend. As such, they cannot render the presently claimed invention obvious. Fenster only contemplates "fast linear reconstruction". Quistgaard does not contemplate any "fast reconstruction" as recited in claim 1. Further, neither reference suggests the desirability of only using selected image data with respect to axially derived data that results in faster reconstruction of the three dimensional image. The references themselves must suggest the desirability of doing so.

As to claims 4, 9 and 10, these also depend from claim 1 which recites fast reconstruction of data acquired from a non-linear scanning path. Neither Quistgaard nor Fenster '473 nor Hossack '027 disclose this novel feature and thus these claims are patentable.

It is asserted that the same argument holds true to claims 6, 7, 8, 11 and 12.

Conclusions

In view of the above amendments and remarks, it is believed that this application is now in condition for allowance, and a Notice thereof is respectfully requested.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 625-3507. All correspondence should continue to be directed to our address given below.

Respectfully submitted,



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